

Research on the Construction of the Unbalanced Index System of Sports Development in Zhaoqing City

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Abstract: The Delphi method and hierarchical analysis are used to construct the index system of unbalanced sports development in Zhaoqing City, which provides reference for solving the problems related to the unbalanced development of sports development in Zhaoqing City. The results show that the first-level indicators of unbalanced sports development in Zhaoqing City contain 4 items, the second-level indicators contain 12 items, and the third-level indicators contain 31 items, of which the first-level indicators and their weights: school sports (0.35), mass sports (0.32), competitive sports (0.23), and sports culture and exchanges (0.1); and the second-level indicators and their weights: funding and facilities (0.13), teacher strength (0.1), organization of exercise (0.09), conditions of protection (0.09), participation in activities (0.09), athletes (0.09), refereeing team (0.09) coaches (0.08), sports competitions (0.08), sports exchanges (0.06), venues and facilities (0.05), sports culture (0.05); tertiary indicators and their weighted order: per capita sports The three-level indicators and their weights are: per capita investment in sports activities (0.06), per capita area of sports venues (0.05), weekly number of hours of physical education classes in schools (0.05), per capita possession of sports facilities and equipment (0.04), teacher-to-student ratio (0.04), students' average daily activity time (0.04), per capita possession of public sports venues (0.04), and the number of people in the sports population as a percentage of the total population (0.04), Total number of coaches (0.04), number of national coaches (0.04), number of medals won by athletes in competitions at provincial level or above (0.04), teachers' academic qualifications and years of teaching experience (0.03), per capita funding for special activities in mass sports (0.03), rate of opening of sports venues and facilities to the public (0.03), proportion of time spent on sports activities to the rest of the day (0.03), number of senior coaches (0.03), the total number of athletes above the second level (0.03), the number of athletes above the national level (0.03), the number of national sports events per year (0.03), the number of provincial sports events per year (0.03), the number of sports training bases (0.03), the national sports awareness (0.03), the number of personnel dispatched per year (0.03), the students' sports health (0.02), amateur training (0.02), number of first-class referees (0.02), number of national-level referees (0.02), area of dedicated training venues per capita (0.02), number of people participating in sports volunteer activities (0.02), civilization of the field of play (0.02), and the number of hosts per year (0.02).

Keywords: Unbalanced sports development; Indicator system; Delphi method; Hierarchical analysis; Zhaoqing city.

1. Introduction

In recent years, with the rapid development of sports, there are some inherent deficiencies and problems in the development of sports and noticed by the sports community, many of which have not been given enough attention so far [1]. Scholars have pointed out that the unbalanced development of sports mainly refers to the imbalance within each system of the main body of development as well as between the system and the system in terms of the degree and quality of development [2]. It can be manifested as the imbalance of development in terms of political, economic, cultural, social and ecological fields, the imbalance of development in terms of geographical areas such as urban and rural areas and regions, the imbalance of development in terms of industries such as industry, commerce, agriculture and services, and the imbalance of development in terms of populations such as the rich, the middle class, and the poor, and so on. Sports development is part of social development, one of the many problems of social development, and so is its unbalanced development. The multi-layered and unbalanced political, economic and cultural development of our society inevitably also constrains or affects the scale and level of sports development in China, making our sports present a multi-faceted unbalanced situation. And geographic factors are the basic conditions for the expansion of the sports

development gap, economic development and market economy facing a different starting point is the catalyst for the expansion of the sports development gap [3]. China's sports development is manifested in five major imbalances: advanced competitive sports and backward mass sports development imbalance. School sports and competitive sports [4], mass sports development imbalance[5]. Unbalanced development of sports in cities, economically developed areas in the east and rural and economically backward areas in the west. Unbalanced development of lagging ethnic and folk traditional sports and "ahead of the curve" competitive sports. The rapid development of sports practice is unbalanced with the backward development of sports science and technology [6]. Data from various aspects show that the development of sports in China is still insufficient, and there are imbalances from the perspectives of fields, regions and resources [2.4], and will continue to exist for a long time [7]. In the future direction of development, the "14th Five-Year Plan" period of China's sports development will face a more complex and volatile domestic and international environment, the possible increase in the number of risk points, the difficulty of prevention [8], the development of China's sports development should be focused on the development of the focus of the attack to solve the unbalanced and insufficient development of China's sports as the primary problem [9]. It can be seen that the main contradiction of China's society in

the new era has been transformed into the contradiction between the people's growing needs for a better life and the unbalanced and inadequate development. Multifaceted data show that China's sports in the development of brilliant achievements at the same time, its regional development imbalance problem also appears to be particularly prominent.

Zhaoqing is a regional prefecture-level city in Guangdong, an important node city in the Guangdong-Hong Kong-Macao Greater Bay Area, and an important part of the Pearl River-West River Economic Belt. At present, various kinds of sports events and sports for all in Zhaoqing are constantly hot and exciting, and Zhaoqing is moving towards the goal of building a "sports city" in the Guangdong-Hong Kong-Macao Greater Bay Area. How to realize the balanced development of sports in Zhaoqing and the stable and coordinated development of sports lies in a comprehensive and profound understanding of the key issues of unbalanced development of sports. Therefore, this paper will be based on the theory of unbalanced development of sports and related theories of sports development, take the index system of unbalanced development of sports in Zhaoqing City as the research object, and take the results of the theory of unbalanced development of sports as the research basis, innovatively answer the specific problems of unbalanced development of sports in Zhaoqing City, and try to find out the main factors that constrain the unbalanced development of sports in Zhaoqing City, so as to enrich the theoretical system of unbalanced development of sports in Zhaoqing City.

2. Research Objectives and Methodology

2.1. Research object

Zhaoqing sports development imbalance index system and its weights.

2.2. Research Method

2.2.1. Literature method

The literature on sports development imbalance provides a good theoretical foundation for the upcoming development of this study, and if you want to make a breakthrough in the existing theoretical achievements in the issue of sports development imbalance, you have to strengthen the understanding of the research results related to sports development imbalance, introduce its cutting-edge concepts into this study of sports development imbalance in Zhaoqing, and initially select the index system of sports development imbalance in Zhaoqing for this study.

2.2.2. Delphi method

Based on the literature and expert interview method, the experts and scholars in the field of sports development research are surveyed in the form of indicator questionnaires to derive the content and theoretical basis of the indicators of the imbalance of sports development in Zhaoqing City, and the surveyed experts independently assess the evaluation content according to their own accumulation of knowledge and experience, and obtain the statistically significant results of the experts' clustering assessment. According to the preliminary selection of the indicator system, the Likert 5-level scoring method was applied to evaluate the assignment of the indicators. After the preliminary selection of the indicators was assigned by 2 rounds of expert scoring, the weighting coefficients of the indicators were calculated, and the characteristic indicators with obvious differences were

screened ($X \geq 4$), to further construct the indicator system of imbalance in the development of sports in Zhaoqing City. Among them, 6 questionnaires were distributed and 6 valid questionnaires were recovered, with a recovery rate of 100%. The experts interviewed for the survey are shown in Table 1.

Table 1. Experts in questionnaire survey on the index system of unbalanced sports development in Zhaoqing (n=6)

name	sexes	title	work unit	years of experience in the field
Chu XX	male	professor	universities	25
Chen XX	male	professor	universities	22
Ma XX	male	professor	universities	19
Guo XX	male	professor	universities	16
Chen XX	females	professor	universities	15
Xie XX	male	professor	institute	9

2.2.3. Hierarchical analysis

Hierarchical analysis is a complex multi-objective decision-making problem as a system, the goal is decomposed into multiple criteria or many levels, with qualitative indicators of fuzzy quantitative calculation of hierarchical ranking (weights) of the systematic method, in order to further establish the imbalance in the development of sports in Zhaoqing City, the weight coefficients of each indicator, according to the final establishment of the indicator system to design the "imbalance in the development of sports in Zhaoqing City, the indicators". Two by two comparison matrix model" questionnaire, the questionnaire is mainly to engage in sports development of college teachers and experts, such as the distribution and recovery (distribution of questionnaires 5, recovery of questionnaires for 5, the effective recovery rate of 100%). The experts surveyed are shown in Table 2.

Table 2. Survey experts in the two-by-two comparison matrix model of sports development imbalance indicators in Zhaoqing (n=5)

name	sexes	title	work unit	years of experience in the field
ChenXX	male	professor	universities	27
Ma XX	male	professor	universities	23
Xie XX	male	associate professor	universities	20
Tan XX	male	associate professor	universities	19
Wu XX	male	associate professor	research institute	18

3. Results

3.1. Establishment of the Evaluation System of Indicators for Uneven Sports Development in Zhaoqing City

According to the principle of comprehensiveness in the screening of the indicator system, and based on the deep qualitative analysis of relevant literature and theories, four first-level evaluation indicators were established, and 12

second-level evaluation indicators were established by listing the indicators of unbalanced sports development in Zhaoqing at each level, so as to initially construct the indicator system of unbalanced sports development in Zhaoqing. In addition, given the principle of operability in the selection of indicators, the initial selection of indicators suffers from practical

problems such as the multiplicity of indicators. In order to accurately reflect the objective problems of the unbalanced sports development indicator system in Zhaoqing, the Delphi method was applied to the second screening of the initially selected indicators, and 31 secondary evaluation indicators were finally established. See Table 3 below.

Table 3. Indicator system of unbalanced sports development in Zhaoqing City in this study

Level 1 indicators	Secondary indicators	Tertiary indicators
School Sports	Funding Facilities	Per capita investment in sports activities Per capita area of sports venues Per capita sports facilities and equipment
	Faculty	Teacher-student ratio Teachers' qualifications and years of teaching experience Number of hours of physical education classes per week
	Organizational Exercise	Average daily activity time of students Students' physical fitness pass rate
	Mass Sports	Guarantee conditions
Activity Participation		Openness of sports venues and facilities to the public Percentage of sports population in the total population
		Percentage of leisure time spent on sports activities
Coaches		Total number of coaches Number of senior coaches Number of national-level coaches
Athletic Sports	Athletes	Total number of athletes above Grade 2 Number of athletes above national level Amateur Training
	Sports competitions	Number of medals in competitions above provincial level for athletes Number of national sports events held per year
		Number of provincial sports events held per year
	Referee Team	Number of first-class referees Number of national-level referees
Sports Culture and Communication	Facilities	Area of dedicated training venues per capita Number of sports training bases National Sports Awareness
	Sports Culture	Number of Participants in Sports Volunteer Activities Civilization of the playing field
	Sports Exchange	Number of personnel dispatched per year
		Number of hosts per year

3.2. Establishment of weights of indicators of unbalanced sports development in Zhaoqing City

Using hierarchical analysis thinking, and based on the principles of the formula of the hierarchical analysis method, the calculation steps, and so on, to find out the experts' assignment about the indicators in this study (see Table 4). As can be seen from the table, the first-level indicators and their weights are ranked as: school sports (0.35), mass sports (0.32), competitive sports (0.23), sports culture and communication (0.1); the second-level indicators and their weights are ranked as: Funding facilities (0.13), teachers (0.1), organization of exercise (0.09), conditions of protection (0.09), participation in activities (0.09), athletes (0.09), refereeing team (0.09) coaches (0.08), sports competitions (0.08), sports exchanges (0.06), venue facilities (0.05), sports culture (0.05); tertiary indicators and their weights in order as follows. Indicators and their weights are as follows: per capita investment in sports activities (0.06), per capita area of sports venues (0.05), weekly number of hours of physical education classes in schools (0.05), per capita occupancy of sports facilities and equipment (0.04), teacher-student ratio (0.04), average daily activity time of students (0.04), per capita occupancy of public sports venues (0.04), and the number of people

engaged in sports (0.04). Percentage of total population (0.04), total number of coaches (0.04), number of national coaches (0.04), number of medals won by athletes in competitions at the provincial level or above (0.04), teachers' qualifications and number of years of teaching experience (0.03), per capita funding for special mass sports activities (0.03), openness rate of sports venues and facilities for the public (0.03), proportion of time spent in sports to spare time (0.03), proportion of senior coaches' time spent in sports to spare time (0.03), and proportion of time spent on sports to spare time (0.03). (0.03), the number of senior coaches (0.03), the total number of athletes above the second level (0.03), the number of athletes above the national level (0.03), the number of national sports events per year (0.03), the number of provincial sports events per year (0.03), the number of sports training bases (0.03), the awareness of the national sports (0.03), the number of personnel dispatched per year (0.03), the number of students (0.03), and the number of students (0.03). Number of national sports awareness (0.03), number of people dispatched per year (0.03), students' physical fitness pass rate (0.02), amateur training (0.02), number of first-class referees (0.02), number of national referees (0.02), per capita area of dedicated training venues (0.02), number of people participating in sports volunteering (0.02), civilization of the field of play (0.02), and the number of people hosted per year (0.02).

Table 4. List of weights of sport development imbalance indicators in Zhaoqing in this study

Level 1 indicators	weights	Secondary indicators	weights	Tertiary indicators	weights				
School Sports	0.35	Funding Facilities	0.13	Per capita investment in sports activities	0.06				
				Per capita area of sports venues	0.05				
		Faculty	0.1	Organizational Exercise	0.09	Per capita sports facilities and equipment	0.04		
						Teacher-student ratio	0.04		
						Teachers' qualifications and years of teaching experience	0.03		
				Guarantee conditions	0.09	Activity Participation	0.09	Number of hours of physical education classes per week	0.05
								Average daily activity time of students	0.04
								Students' physical fitness pass rate	0.02
		Mass Sports	0.32	Coaches	0.08	Per capita funding for mass sports activities	0.03		
						Per capita area of public sports venues	0.04		
Athletes	0.09			Sports competitions	0.08	Openness of sports venues and facilities to the public	0.03		
						Percentage of sports population in the total population	0.04		
						Percentage of leisure time spent on sports activities	0.03		
						Total number of coaches	0.04		
Athletic Sports	0.23			Referee Team	0.09	Number of senior coaches	0.03		
						Number of national-level coaches	0.04		
				Facilities	0.05	Referee Team	0.09	Total number of athletes above Grade 2	0.03
								Number of athletes above national level	0.03
		Sports Culture and Communication	0.1	Sports Culture	0.05	Amateur Training	0.02		
						Number of medals in competitions above provincial level for athletes	0.04		
				Sports Exchange	0.06	Referee Team	0.09	Number of national sports events held per year	0.03
								Number of provincial sports events held per year	0.03
Sports Exchange	0.06	Sports Exchange	0.06	Number of first-class referees	0.02				
				Number of national-level referees	0.02				
Sports Exchange	0.06	Sports Exchange	0.06	Area of dedicated training venues per capita	0.02				
				Number of sports training bases	0.03				
Sports Exchange	0.06	Sports Exchange	0.06	National Sports Awareness	0.03				
				Number of Participants in Sports Volunteer Activities	0.02				
Sports Exchange	0.06	Sports Exchange	0.06	Civilization of the playing field	0.02				
				Number of personnel dispatched per year	0.03				
Sports Exchange	0.06	Sports Exchange	0.06	Number of hosts per year	0.02				

4. Discussion

This study constructed the Zhaoqing sports development imbalance index system and its weights through Delphi method and hierarchical analysis method, and it was concluded that the Zhaoqing sports development imbalance index system contains 4 first-level indexes, 12 second-level indexes, and 31 third-level indexes. The index system well describes the overall dimensions of the index system of unbalanced sports development in Zhaoqing, and provides theoretical references for sports development researchers to study the problem of unbalanced sports development. The study shows that there are large imbalances and gaps within competitive sports, school sports and mass sports. Geographically, the imbalance mainly stems from regional differences, which is further emphasized by the obvious divide between urban and rural areas^[7,8]. This imbalance is further exacerbated by the distribution of resources, both in terms of tangible resources and awareness. Fundamentally, the challenges to sport development include multifaceted asymmetries that require comprehensive strategies to correct the gaps in all areas^[2,9]. This study explores the multilevel indicators of sports development imbalance in Zhaoqing and

their respective weights to provide an idea for understanding and solving specific problems. For the first-level indicator school sports, it has the highest weight and is the key determinant in the overall sports development pattern. The tertiary indicators emphasize the importance of per capita input, the number of hours of physical education per week, and the teacher-student ratio; therefore, the solid foundation of school sports lays the groundwork for fostering a culture of physical activity and health among students. For the mass sports indicator, the weight of mass sports is 0.32, which emphasizes the importance of extensive mass participation. It contains secondary indicators, including activity participation and the extent to which stadiums are open to the public, reflecting a commitment to inclusiveness and accessibility in promoting community-wide participation in sport and physical activity. For the competitive sports indicator, it has a weighting of 0.23, and it plays an important role in enhancing the overall level of sports development. Tertiary indicators such as the number of medals in provincial and above competitions and the number of sports training bases emphasize the pursuit of excellence and the development of talent at a higher competitive level. For the sports culture and exchange indicator, although its weight is 0.1, sports culture

and exchange contribute greatly to urban sports development. The tertiary indicators, including the proportion of time spent on sports activities in spare time and the number of people involved in sports volunteer activities, reveal the cultural and social dimensions of sports, emphasizing community participation and volunteerism. In summary, a nuanced review of these key dimensions within the constructed indicator framework facilitates targeted interventions and strategic planning. Stakeholders in Zhaoqing can address the specific elements outlined in each dimension through this study's indicator system in an effort to create a balanced, inclusive, and thriving sports environment that prioritizes not only athletic success, but also community participation, accessibility, and cultural enrichment. In summary, the index system of unbalanced sports development in Zhaoqing constructed in this study innovatively answers the specific problems of unbalanced sports development and enriches the theoretical system of unbalanced sports development in Zhaoqing, but this study has not conducted empirical research on the data, and it only stays at the theoretical level, and in the future, the researchers need to strengthen empirical investigation and research with a view to making the index system of this study more scientific and reasonable.

5. Conclusion

The index system of unbalanced sports development in Zhaoqing City contains 4 first-level indicators, 12 second-level indicators and 31 third-level indicators. Among them, the first-level indicators-school sports, mass sports, competitive sports, sports culture and communication-have the highest weighting of 0.35. The second-level indicators include funding, facilities, teachers' strength and organization, which play a crucial role in the assessment of these four key aspects. Tertiary indicators provide granular insights, focusing on financial investment, infrastructure, education, and public participation. The unbalanced sports development indicator system in Zhaoqing constructed in this study enables stakeholders to accurately locate the specific requirements for sports development in Zhaoqing and provides a reference for the development of targeted strategies; therefore, it is recommended that in the future, emphasis should be placed on school sports, mass sports, competitive sports, and sports

culture to ensure that sports in Zhaoqing develops in a balanced and stable direction.

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References

- [1] WANG Jiahong,BAO Mingxiao,TAN Hua,YUAN Wei. Focusing on 40 years of reform and opening up:Reflections on the reform and development of sports in Zhaoqing[J]. Research on Physical Education,2018,1(06):64-73.
- [2] WANG Li,ZHANG Changsi,ZHONG Bingshu,SU Min. Major social contradictions and sports development in Zhaoqing in the new era [J]. Journal of Beijing Sport University, 2019, 42(02): 8-15+54.
- [3] HAN Zosheng,ZHANG Dove,LI Peng,YANG Lansheng. An analysis of the causes of unbalanced sports development among regions in Zhaoqing City at the primary stage of socialism[J]. Journal of Harbin Institute of Physical Education, 1999(04):1-5.
- [4] He Nan. Geographic analysis of unbalanced development of competitive sports in Zhaoqing[J]. Liaoning Sports Science and Technology,2013,35(05):1-4.
- [5] Li Zhenhua. Research on the imbalance of mass sports development in urban and rural areas of Zhaoqing and countermeasures for rural sports development[D]. Qufu Normal University,2013.
- [6] Dong Xinguang. The imbalance of sports development at the primary stage of socialism[J]. Journal of Tianjin Sports Institute,1989(02):24-27.
- [7] Xu Kaichun. Unbalanced development of sports in Zhaoqing and its causes[J]. Sports Science,1998(03):37-39.
- [8] Bao Mingxiao. "Analysis and Response to Internal and External Environment of Sports Development in Zhaoqing City during the 14th Five-Year Plan Period[J]. Sports Science, 2020, 40(06):3-8+15.
- [9] KE Yong,HUANG Bo,DONG Si,PENG Xiaowei. Experience revelation and future path of sports development in Zhaoqing City over the 70 years since the founding of the new Zhaoqing City[J]. Journal of Wuhan Sports Institute,2020,54(01):12-18.